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Gorbachev's Allocative Choices

Constraints, Dilemmas, and Policy Directions

Charles Wolf, Jr., Benjamin Zycher,
Heide Phillips Shockley, Jeannette VanWinkle

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September 1990

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PREFACE

This report formulates estimates of competing resource claims facing the Soviet leadership and develops alternative combinations of allocations to these competing sectors. The aim is to highlight (1) the conflicting allocative choices and policy options confronting the Soviet leaders and (2) the severity of the resource constraints they face in approaching these choices. The report evaluates the implications of these choices with respect to reductions in Soviet military spending, arms control, foreign capital inflows, the production of consumer goods by the defense industry, subventions to the external Soviet empire, and prospects for fundamental economic reform.

This work is part of RAND's International Economic Policy Program. The research was sponsored by the Under Secretary of Defense for Policy under the auspices of RAND's National Defense Research Institute (NDRI), a federally funded research and development center supported by the Office of the Secretary of Defense and the Joint Chiefs of Staff. It should be of interest to members of the U.S. defense and foreign policy communities concerned with evolving Soviet economic policy and military policy, civilian-military relations, defense-policy formulation, arms control behavior, and Soviet economic reform. Briefings of the study have been presented to the Defense Advisory Group of the NDRI, the Under Secretary of Defense for Policy, the Director of Net Assessment, and the RAND-Hoover symposium on *The Defense Sector in the Soviet Economy*.

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SUMMARY

Perestroika in the Soviet Union confronts a crucial dilemma. The cumulative shortcomings of centralized control and administered prices create a compelling need for a decentralized, market-oriented, competitive system. On the other hand, strong pressures exist to maintain centralized decisionmaking to resolve sharply conflicting demands for scarce resources.

This study focuses on the conflicting demands that constitute the second horn of this dilemma. The aim is to estimate the conflicting resource demands impinging upon the Soviet leadership as well as upon the increasingly vocal and restive Soviet populace.

The analysis proceeds in three steps:

1. We make estimates of the Soviet gross national product (GNP) as well as final demands for consumption and investment in 1995 and 2000 for 11 sectors of the Soviet economy: military; health; housing; education; food; nonfood consumer goods; energy; transportation and communication; environmental protection; residual investment in machinery, equipment, and construction; and the empire. For each of these competing demands, "high," "medium," and "low" estimates for 1995 and 2000 are made in 1982 rubles.
2. We create four initial packages of these competing sectoral demands to illustrate alternative policy directions that the Soviet leadership might choose within the GNP "budget line": a "public consumption policy" comprising relatively high allocations to housing, health, and education; a "private" or "personal consumption policy" reflecting emphasis on food and nonfood consumer goods; an "investment and infrastructure policy" concentrating on the infrastructure and machinery and equipment sectors; and a "military modernization policy" reflecting medium allocations to the military and the machinery and equipment sectors and low allocations to other sectors. We formulate several additional options to reflect deeper military cuts, a rolling back of sectoral demands to 1987 levels, and substantial further decline in the Soviet economy's performance through the early 1990s.
3. Finally, we draw implications for aggregate resource allocation policies, Soviet military spending, arms control, Soviet imports of capital and commodities, and the pace and prospects of *perestroika*.

Benchmark estimates for the 11 sectors in 1987 are placed in the context of alternative estimates of Soviet GNP in that year.

We derive the figures for military outlays in 1987 from Central Intelligence Agency and Defense Intelligence Agency estimates of both aggregate military expenditures and the shares of this total attributable to each of the five Soviet military services and to research, development, test, and evaluation. Comparing the military expenditure figures in 1987 with the alternative estimates of the Soviet GNP results in a range of estimates for the military burden (i.e., the ratio of military spending to Soviet GNP) between 14 and 24 percent of Soviet GNP.

Proceeding from the 1987 benchmark figures, we make high, medium, and low estimates for Soviet military spending covering the period through 2000.

Several important inferences can be drawn from the illustrative policy options facing the Soviet leadership.

1. The four initial consumption, investment, and military alternatives would exceed the ruble estimates of Soviet GNP in 1995 by from 6 to 40 percent of Soviet GNP.
2. Pressures to reduce military spending are and will be intense. Nevertheless, even if military spending were cut more deeply than in our initial policy alternatives, only modest goals for the nonmilitary sectors could be realized.
3. The Soviet Union will be strongly motivated to seek types of arms control that involve genuine force reductions and real resource savings in operating and investment costs. A corollary of this point is that pressures will grow to augment (1) production of consumer goods by using capacity in defense industries and (2) conversion of the defense industry to civil production.
4. In view of the resource gaps represented by the various policy options, Soviet interest in substantial external financing to fund commodity imports may be very high—in the neighborhood of several hundred billion dollars—in the next decade.
5. Pressures are likely to intensify to reduce subventions to members and associates of the extended Soviet empire. For example, from estimates of empire costs embodied in all of the policy packages, we infer reductions of 40 percent or more from 1987 levels expended for Cuba, Vietnam, Afghanistan, Nicaragua, North Korea, and elsewhere in the Third World.

6. The study's principal policy alternatives assume that the Soviet economy experiences slow but sustained growth between 1987 and 2000. If, instead, the alternatives assume that substantially negative growth will occur through the early 1990s before modest growth resumes, sectoral resource allocations would decline below their 1987 levels, notwithstanding deep cuts in military and empire spending.
7. As Soviet leaders become increasingly aware that their declared objectives cannot be realized by centrally determined resource reallocations, the dilemma posed at the outset—between pressures for centralized allocative decisionmaking and for decentralization and fundamental systemic reform—will intensify. Ultimately, easing aggregate resource constraints depends on a more decentralized, genuinely market-oriented system reform. One might surmise, from this line of reasoning, that a radical interpretation of *perestroika* will gain favor because it offers the only way of eventually resolving the dilemma.

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This report has benefited from detailed comments on an earlier draft by RAND colleague Keith Crane and by Dmitri Steinberg of Intelligent Decision Systems, Berkeley, California, and from several substantive suggestions by Andrew Marshall, Director of Net Assessment in the Department of Defense.

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I. BACKGROUND AND PURPOSE

The content, progress, and prospects of economic restructuring (*perestroika*) in the Soviet Union confront a crucial dilemma. On the one hand, the cumulative shortcomings of state control, centralized decisionmaking, and administered prices create a compelling need for a more decentralized, market-oriented economic system. Indeed, few in the West have been as severe in deplored the existing system's shortcomings or as convincing in their advocacy of decentralization as Gorbachev himself and some of his top economic advisers.¹

On the other hand, strong pressures exist to retain or even increase centralized decisionmaking and resource allocation to resolve the immediate and sharply conflicting demands for scarce resources (1) to raise personal consumption as well as quasi-public consumption in health care, education, and housing; (2) to maintain and improve Soviet transportation, communications, and distribution; (3) to reverse the deterioration of air and water quality and the damage to the Soviet natural environment; (4) to prudently reduce military spending while modernizing the armed forces; and (5) to selectively reduce expenditures on the extended, if diminishing, Soviet empire.²

This dilemma—pressure for decentralization versus pressure for centralization—is not adequately conveyed by the standard “guns versus butter” metaphor. It also involves such questions as the kinds of weapons to forgo, retain, or enhance—at what time and for what contingencies; the kinds of consumption and investment to expand and for which republics and with what delays; and the types of subventions to Eastern Europe, Cuba, Vietnam, Nicaragua, Afghanistan, and elsewhere that should be reduced, maintained, or even increased.

¹See, for example, Mikhail Gorbachev, *Perestroika: New Thinking for Our Country and the World*, Harper & Row Publishers, New York, 1987; and Abel Aganbegyan, *Inside Perestroika: The Future of the Soviet Economy*, Harper & Row Publishers, New York, 1989. Aganbegyan notes the following: “Clearly the system of centralized supply ties an enterprise up with directives and leaves no room to manoeuvre. . . . It is virtually impossible to live and work under such an inflexible administrative system” (p. 32). See also Richard E. Ericson, “The Soviet Economic Predicament,” in Henry Rowen and Charles Wolf, Jr. (eds.), *The Future of the Soviet Empire*, St. Martins Press, New York, 1988, especially pp. 117–120 on the need (and poor prospects) for radical decentralization.

²Aganbegyan inadvertently highlights this part of the dilemma by associating *perestroika* with “new spending in the social sphere, a breakaway in the provision of housing and socially necessary buildings, much greater expenditures on health and education, redoubled growth of food production, triple growth in the service sector, and vast capital and currency investments in the development of light industry” (*Inside Perestroika*, p. 113).

This RAND study focuses on the conflicting demands that create pressure for centralization and that constitute the second horn of Gorbachev's dilemma. Our aim is to estimate the types and magnitudes of the conflicting resource claims impinging upon, constraining, and, one might surmise, dividing the Soviet leadership as well as the increasingly vocal and restive Soviet populace.

The range and complexity of these conflicting allocative choices—the competition between the domestic and international ones and between the resource demands for public or collective goods on the one hand and private or personal ones on the other—are suggested by the following list:

1. Within the military, choices arise between nuclear and conventional forces, between offensive and defensive forces and strategies, and, in turn, among the five Soviet military services, between their current sizes and capabilities and their future ones, and between these forces and Soviet research and development (R&D).
2. Within the industrial sector, choices must be made among investing in (1) the defense industry, (2) expanding capacity to produce consumer goods, (3) converting defense industry to civil production, and (4) single- or dual-use (defense and civil) production capacity.
3. Within the consumption sectors, choices arise between production for personal or "private" consumption (food, clothing, household appliances, cars, etc.) and "collective" or quasi-collective consumption (health care, housing, education). Indeed, the health sector warrants special consideration not only or even principally because of the deterioration of health conditions in the Soviet Union in the past two decades, but also because of the actual or potential effects of health conditions on labor productivity.
4. In the public investment sphere, difficult choices arise between equipment and construction for the maintenance and improvement of public infrastructure in transportation, distribution, communications, and environmental quality.
5. Still other allocative issues arise in choosing among the preceding selections and those involved in the Soviets' crucial energy sector: whether, and to what extent, to meet the substantial resource demands for retrofitting the large number of Soviet graphite nuclear reactors in the aftermath of Chernobyl; and what to do about the rising extraction and transportation costs relating to oil, gas, and coal.

6. Finally, with respect to present and future international affairs, the Soviet leadership confronts the question of how much and how rapidly to reduce the support it has provided for extended international activities in Eastern Europe, Cuba, Vietnam, Angola, Nicaragua, Cambodia, Mozambique, and also Afghanistan (notwithstanding the withdrawal of Soviet combat forces there).

II. ANALYTICAL APPROACH

Against this background, the analysis proceeds by the following steps:

1. We formulate on a sector-by-sector basis the range of potential allocations of final output and final resource use for investment and consumption among major competing claims in the following sectors: the military, including its five services and R&D; health; housing; education; food and nonfood consumer goods and services (two sectors); energy; transportation and communication; environmental protection; machinery, equipment, and construction (not already included in the previous sectors); and the extended Soviet empire's incremental costs. For each of these sectors, we make "high," "medium," and "low" estimates of final resource use. The estimates comprise final demands for consumption and investment attributable to the specified sectors.¹ Estimates of the competing sectoral claims are presented principally in constant rubles and, where feasible, in constant dollars as well, in the context of alternative estimates of Soviet GNP relative to that of the United States.
The aim of the separate sectoral estimates is not precise accuracy—something that is, in any case, fanciful to associate with Soviet economic data—but illumination of the broad character and scale of the Soviet allocative predicament.
2. We then package the range of competing resource claims for the several end-use sectors to reflect four alternative policy directions that the Soviet leadership may choose to take: a "public consumption policy" emphasizing collective or public consumption through relatively high allocations to housing, health, and education, with medium or low allocations to other sectors; a "private" or "personal consumption policy" reflecting relatively high allocations to food and nonfood consumer goods sectors, with medium or low allocations to other sectors;

¹The sectoral estimates for housing, health, and education include investment and operating costs. The estimates for food and nonfood consumer goods cover final consumption. Estimates for the infrastructure sectors (energy, transportation and communication, and environmental protection) represent final investment demand. Estimates for machinery, equipment, and construction are intended to cover investment demands for defense production, the consumer-goods industry, and agriculture.

a "technology, capital, and infrastructure policy" reflecting medium or high allocations to infrastructure and to machinery and equipment, with low allocations to other sectors including the military; and a "military modernization policy" represented by medium allocations for the military and for the machinery, equipment, and construction sector, with low allocations to other sectors.

3. We formulate several additional options (1) to illustrate the effects of deeper military cuts and the possibility of combining austerity with reallocations and reform and (2) to highlight the effects of a possibly serious decline in the economy's near-term performance.
4. Finally, we draw implications from the analysis for aggregate resource allocation policies, Soviet military spending, arms control, imports of capital and commodities, and the pace and prospects of *perestroika*.

III. GROSS NATIONAL PRODUCT (GNP), MILITARY SPENDING, AND THE MILITARY BURDEN

SOVIET GNP AND SOVIET STATISTICAL PROBLEMS

The size of the Soviet GNP constrains the allocative choices of the Soviet leadership. The GNP is equal to the sum of final resource uses (i.e., final demand)—consisting of personal or private consumption plus collective consumption (government)—plus military spending plus investment plus the balance of payments surplus on current account (or minus the current account deficit). If imports exceed exports, the other components of final resource use will exceed the GNP by the amount of this excess. If exports exceed imports, the GNP will be greater than the sum of other final resource uses by the amount of this excess.

These basic relationships apply to the national accounts of all countries. When sizing the Soviet economy by applying these relationships empirically, one encounters several problems specific to the Soviet case. One problem is that the underlying Soviet statistics are unreliable and tend to be systematically biased upward. This bias follows from the incentive structure of a centrally planned economy that focuses on quantitative production norms in evaluating the performance of producing units. Moreover, this bias increases as the complexity and hence the number of system reporting nodes increase.¹

A second problem in dealing with Soviet statistics is the extent to which hidden inflation is overlooked or underestimated by the usual procedures for deflating value data in current prices to arrive at estimates in constant prices. In an economic system based on administered prices, rather than market-based ones, hidden inflation can take the form of (1) diminished product quality for output evaluated at constant prices or (2) the attribution of higher prices to products whose

¹See Ericson, "The Soviet Economic Predicament," especially pp. 105-110; and Anders Aslund, *Gorbachev's Struggle for Economic Reform*, Cornell University Press, Ithaca, New York, 1989, pp. 8-9 ff. The upward bias and unreliability of Soviet statistics have been documented and elaborated by a number of other Soviet and Western economists. See, for example, Vasili Selyunin and Grigori Khanin, "Cunning Figures," *Novy Mir*, February 1987; and Anders Aslund, "How Small Is the Soviet National Income?" in Henry Rowen and Charles Wolf, Jr. (eds.), *The Impoverished Superpower: Perestroika and the Soviet Military Burden*, ICS Press, San Francisco, 1990.

invoiced description involves fictitious rather than actual quality upgrading. Both types of hidden inflation have occurred frequently and extensively in the Soviet economy in recent years.²

A third problem that arises when sizing the Soviet economy concerns the production of tangible, but valueless, output as a consequence of incentives faced by enterprises to satisfy quantitative production norms. Thus, to meet these norms, enterprises may produce output that is delivered to other user enterprises but that the latter regard as worthless. Examples of such valueless output abound in accounts by Soviet as well as Western writers: bulldozers delivered to construction and mining enterprises whose managers, owing to prior experience, prefer to let the equipment stand idle than to risk the consequences of fragile blades and underpowered engines; consumer appliances that not only do not work but are a safety hazard to their users; and so on.³ In effect, this is the ultimate stage of quality degradation.

Table 1 shows benchmark estimates for a ruble GNP for the Soviet Union in 1987, calculated by the intelligence community.⁴ The problems noted above are less serious for establishing a ruble GNP estimate for a particular year than for making comparisons of GNP in constant rubles over time. However, these problems are especially serious and relevant when sizing the Soviet economy involves comparing ruble GNP with its equivalent dollar GNP. In this regard, the CIA has placed Soviet GNP at half, or slightly more than half, that of the United States. An increasing number of Western analysts regard this estimate as unrealistically high.⁵ Indeed, the specific problems noted above pertaining to Soviet statistics would tend to lower the ratio between the Soviet GNP (in dollars) and the U.S. GNP. Conse-

²See Philip Hanson, *USSR: Puzzles in the 1985 Statistics*, Radio Liberty Research, RL 439/86, November 1986; Aslund, "How Small Is the Soviet National Income?" pp. 45-46 ff.; Aslund, *Gorbachev's Struggle*, p. 15; and Aganbegyan, *Inside Perestroika*.

³See Aganbegyan, *Inside Perestroika*, pp. 33-36 ff.

⁴The Central Intelligence Agency (CIA) and Defense Intelligence Agency (DIA), "The Soviet Economy in 1988: Gorbachev Changes Course," a report presented to the Subcommittee on National Security Economics of the Joint Economic Committee, April 1989. The CIA estimates employ the adjusted-factor cost methodology that is subject to a number of theoretical as well as other shortcomings. See Harry Rowen and Charles Wolf, Jr., "The Soviet Economic Crisis," in Rowen and Wolf, *The Impoverished Superpower*, pp. 10-12.

⁵Compare Richard E. Ericson, "The Soviet Statistical Debate," in Rowen and Wolf, *The Impoverished Superpower*, and Aslund, *Gorbachev's Struggle*.

Table 1

ESTIMATES OF SOVIET GNP AND MILITARY SPENDING, 1987
(In billions of 1982 rubles and dollars)

Category	Service Share ^a	Estimates		Alternative Estimates	
		R	\$	R	\$
GNP	NA	721 ^b	1731 ^c	721	1298 ^d
Military expenditures	—	119 ^e	246 ^f	131 ^g	271 ^g
Ground forces	23	28	57	30	62
Air forces	22	26	54	29	60
Naval forces	18	21	44	24	49
Air defense forces (PVO)	11	13	27	14	30
Strategic Rocket Forces (SRF)	6	7	15	8	16
RDT&E	20	24	44	26	54

NOTE: NA means not applicable; RDT&E means research, development, test, and evaluation.

^aAll numbers in this column are percentages; see text for an explanation of how they were derived.

^bCIA/DIA, "The Soviet Economy in 1988," p. 40.

^cCharles Wolf, Jr., et al., *Long-Term Economic and Military Trends, 1950-2010*, The RAND Corporation, N-2757-USDP, April 1989, pp. 4, 9 (hereinafter referred to as Trends). The original GNP estimate in 1986 dollars (\$2037 billion)—about half that of the United States—has been converted to 1982 dollars using the U.S. GNP deflator; see *Economic Indicators*, April 1989, U.S. Government Printing Office, p. 2 (2037/1.177 = \$1730.7).

^dTrends, p. 9. The low alternative GNP figure in 1986 dollars, \$1528 billion (about 37 percent of that of the U.S. GNP), has been converted to 1982 dollars (see footnote c; 1528/1.177 = \$1298.2 billion). See also Ericson, "The Soviet Economic Predicament"; Aslund, "How Small Is the Soviet National Income?"; Selyunin and Khanin, "Cunning Figures"; and Rowen and Wolf, "The Soviet Economic Crisis."

^eSoviet 1987 military expenditures in 1982 rubles are from data and charts provided by the CIA, Soviet Analysis Division, "Investment and Operating Expenditures by Service," 1988, estimated as 16.5 percent of Soviet GNP.

^fSoviet 1987 military expenditures are based on Derk Swain, "The Soviet Military Sector: How It Is Defined and Measured," in Rowen and Wolf, *The Impoverished Superpower*. The dollar expenditure figure is derived from Swain's chart comparing U.S. and Soviet military expenditures in 1986 dollars and is adjusted to 1982 dollars using the U.S. GNP deflator. The resulting estimate is 14.2 percent of Soviet GNP in dollars.

^gSee David Epstein, "The Economic Costs of Soviet Security and Empire," in Rowen and Wolf, *The Impoverished Superpower*; and Rowen and Wolf, *The Future of the Soviet Empire*, pp. 283 ff. Shares of the five military services and RDT&E are assumed to be the same in the alternative estimates as in the base-case estimates for 1987. The resulting shares of total military expenditures are 18.2 percent for ruble GNP and 20.9 percent for dollar GNP.

quently, Table 1 also shows an alternative estimate of Soviet GNP in dollars that is closer to a third than a half of the U.S. GNP in 1987.⁶

Inaccuracy in sizing the Soviet economy is one of the fundamental problems presented by reliance on the CIA data. Another is the incompatibility, which Dmitri Steinberg has emphasized, between the CIA data covering GNP and the separately estimated military expenditure data.⁷ Despite these and other shortcomings, most of the following analysis draws principally on the CIA data because of their salience and familiarity rather than their reliability.

MILITARY EXPENDITURES IN 1987

The benchmark figures for military expenditures in 1987 are derived from CIA and DIA estimates of both total expenditures and the shares of this total attributed to each of the five military services and to RDT&E (research, development, test, and evaluation). Our estimates of support costs, which were not separately attributed by the CIA and DIA to the individual services, assign these costs to the five services in accord with the shares of the respective services' expenditures for direct operations.

The estimate of the military burden (i.e., the ratio of military spending to Soviet GNP) that results from the calculation of the constant price data is slightly over 14 percent (see Table 1, footnote f). The alternative estimates for both ruble and dollar military expenditures shown in Table 1 are based on the premise that total military outlays in 1987 were about 10 percent higher in both rubles and dollars than the base-case CIA estimates, as explained below. The CIA estimates omit outlays for such purposes as military airlift provided by Aeroflot, naval support services provided by the merchant marine, and other military-related costs incurred by Soviet agencies other than the defense ministry and the military services. The resulting military burden estimates shown in the last two columns of Table 1 are 18.2

⁶Other estimates (by Aslund, Igor Birman, Robert Campbell, and Ericson) of the relative Soviet-U.S. dollar GNPs span a wide range from 25 to 40 percent. See Aslund, "How Small Is the Soviet National Income?"; Birman, "The Soviet Economy: Alternative Views," *Russia*, Vol. 12, 1986; and Birman, *Personal Consumption in the USSR and the USA*, St. Martin's Press, New York, 1989. Campbell's estimate is cited in Paul Marer, *Dollar GNPs of the USSR and Eastern Europe*, Johns Hopkins Press, Baltimore, 1986; Ericson's is in "The Soviet Economic Predicament."

⁷See Dmitri Steinberg, "Soviet Defense Economic Trends under Gorbachev," Intelligent Decision Systems, Berkeley, unpublished manuscript, 1989; and Steinberg, "The Real Size and Structure of the Soviet Economy: Alternative Estimates of Soviet GNP and Military Expenditures for 1987" (paper written for the RAND-Hoover symposium on *The Defense Sector in the Soviet Economy*, 1990).

percent for ruble GNP and just under 21 percent for dollar GNP.⁸ If the additional costs of the extended Soviet empire are added to these strictly military expenditure estimates, the total security burden on the Soviet economy in the 1987 benchmark period would be approximately 3 percent higher as a share of the Soviet GNP.⁹

The figures in the second column of Table 1, "Service Share," were estimated by the following procedure:

1. Services' shares of assigned spending are interpolated from data provided by the Soviet Analysis Division of the CIA (SOVA).¹⁰ Total cumulative spending (directly attributed to five services) for 1981 to 1985 equals 300 billion rubles, of which the ground forces' share is 29 percent, air forces' 28 percent, naval forces' 12 percent, air defense forces' (PVO's) 14 percent, and Strategic Rocket Forces' (SRF's) 7 percent.
2. Total support costs, unattributed to individual services, are estimated at 118 billion rubles, and this total is imputed to the five services according to the above percentage shares.
3. Services' shares, excluding RDT&E, are estimated by a two-step procedure:
 - (a) The expenditure share directly assigned to each of the five services in the SOVA graph is applied to 57 percent of total defense spending, according to the CIA estimates. The remaining 43 percent of total spending is divided between support costs (23 percent) and RDT&E (20 percent).
 - (b) The aggregate support cost share of the total (23 percent) is divided among the five services on the premise that each service's percentage of total support costs is the same as that service's percentage of investment and operating costs. For example, ground forces account for 29 percent of investment and operating costs, and these costs are 57 percent of total defense costs. We therefore assume that 29 percent of total support costs are also incurred by the ground forces. Consequently, since support costs represent

⁸These estimates are probably on the low side. Aslund, for example, places the burden figure in a range between 22 and 30 percent. Informally, several Soviet economists concur with these high figures. Compare Aslund, "How Small Is the Soviet National Income?" p. 15.

⁹See Epstein, "The Economic Costs of Soviet Security," and Charles Wolf, Jr., et al., *The Costs and Benefits of the Soviet Empire, 1981-1983*, The RAND Corporation, R-3419-NA, August 1986.

¹⁰See SOVA chart on "Investment and Operating Expenditures by Service," 1988.

23 percent of total defense costs, the ground forces' share of the total is:

$$29 \text{ percent} \times (57 \text{ percent} + 23 \text{ percent}) = 23 \text{ percent}$$

Shares for the other services are calculated in the same way.

4. Expenditures in rubles and dollars are calculated by multiplying service shares by the corresponding ruble and dollar estimates of total defense spending. We have made the simplifying assumption that each of the services' shares and the share of RDT&E in ruble military expenditures also apply to their corresponding shares of military expenditures in dollars.

ALTERNATIVE MILITARY AND GNP ESTIMATES FOR 1995 AND 2000

Proceeding from the 1987 benchmark figures, Table 2 summarizes alternative high, medium, and low estimates for Soviet military expenditures over the next ten years.

The strategic rationale underlying these alternatives is a progressive movement away from a massive, offensive, and forward-deployed conventional force and a large land-based Intercontinental Ballistic Missile nuclear force toward forces structured along the lines of "defensive defense," "nonprovocative defense," or "reasonable sufficiency." This altered military posture is construed to mean smaller conventional as well as nuclear forces and reduced naval and projection forces, perhaps with some degree of modernization of the smaller remaining forces.¹¹ In accord with this rationale, the budget shares of the ground forces, naval forces, and SRFs vary directly with the high, medium, and low levels of military spending, while the RDT&E and PVO's shares rise as the aggregate spending level declines; the air forces' share of the total remains constant for the three different spending levels, on the premise that their close support and attack roles are relatively unaffected by the doctrinal change.

The GNP projections (Table 2, footnote a), which ultimately impose aggregate constraints on final resource use by the military as well as by other sectors, are based on the assumption of (1) a real rate of growth from 1987 through 1995 of 1.6 percent and (2) a 2 percent annual growth rate from 1996 to 2000. These growth rates, derived from prior RAND analysis, are slightly higher than the base-case estimates in

¹¹See Jeremy R. Azrael, *The Soviet Civilian Leadership and the Military High Command, 1976-1986*, The RAND Corporation, R-3521-AF, June 1987.

Table 2
ALTERNATIVE SOVIET MILITARY SPENDING ESTIMATES: 1995, 2000
(In billions of 1982 rubles and dollars)^a

Category	Service	1995				2000			
		High ^b		Medium ^c		High ^b		Medium ^c	
		Share	R	\$	Share	R	\$	Share	R
Military expenditures	—	129	268	—	119	246	—	98	203
Ground forces	23	30	61	20	24	49	18	37	32
Air forces	22	28	59	22	26	54	22	45	31
Naval forces	18	23	48	17	20	42	16	32	25
PVO	11	14	29	12	14	30	13	12	15
SRF	6	8	16	5	6	12	5	10	8
RDT&E	20	26	53	24	29	59	26	25	33

^aEstimates are based on the following GNPs: 1995 base case of 818 billion R or \$1965 billion; 1995 alternative of 818 billion R or \$1473 billion; 2000 base case of 900 billion R or \$2162 billion; 2000 alternative of 900 billion R or \$1621 billion. The following does not pertain to alternative ruble GNPs: GNP estimates assume, in the base case, a real growth of 1.6 percent annually from 1987 to 1995 and 2 percent annually from 1996 to 2000 (see Table 1 and discussion in Trends, pp. 8-9. The alternative estimates for 1995 and 2000 apply the same growth rates to the alternative (lower) dollar estimates for 1987 (see Table 1).

^bDefense spending is assumed to be 119 billion R and \$246 billion in 1987 and to grow in real terms by 1.5 percent per year through 1995 and 2000. Service shares and RDT&E share are assumed to remain at 1987 proportions.

^cDefense spending is assumed to remain through 1995 at the lower of the alternative levels assumed in 1987 (namely, 119 billion R and \$246 billion) and to grow by 2 percent per year thereafter through 2000.

^dDefense spending is assumed to decline by 25 percent by 1995 from the higher level assumed in 1987 (namely, 131 billion R and \$271 billion) and to grow by 2.5 percent per year thereafter through 2000.

that earlier work, thereby providing an *a fortiori*, or upper bound, basis for evaluating the resource constraints under which Soviet allocative choices must be made.¹² We assume the same growth rates for ruble and dollar GNPs for reasons of simplicity and convenience. In fact, differences in relative dollar and ruble prices would lead to differences between the corresponding growth rates. Furthermore, these growth rates—whether in rubles or dollars—seem implausibly high in light of the poor performance of the Soviet economy in 1988 and 1989, the deterioration of the consumer market, a slowdown of investment, and the pervasive social and political restiveness in the country. Nevertheless, in the context of analyzing the character and severity of resource constraints and conflicting choices facing the Soviet leadership, these probably optimistic GNP growth rates for the 1990s provide an *a fortiori* context for the later discussion.

The high estimates of military expenditures for 1995 and 2000 shown in Table 2 are based on the benchmark estimates in Table 1 of military spending in 1987 (119 billion rubles and \$246 billion), an assumed growth of military spending in real terms of 1.5 percent per annum throughout the 1995 to 2000 period, and expenditure shares for the five military services and RDT&E shares maintained at the 1987 proportions shown in Table 1. Although the high estimates seem quite unlikely in mid-1990, they are included to bracket the range of possibilities. According to an informed Soviet source, military expenditures in the Soviet Union would be likely to increase only if the "conservative," orthodox Marxist-Leninist elements, led by Ligachev, Polozkov, and Kryuchkov, were to gain control.¹³

The medium estimates in Table 2 are based on the assumption that actual defense spending remains fixed through 1995 at the benchmark levels of 1987, with growth at an annual rate of 2 percent thereafter through 2000, with service shares changing in accord with the basic strategic rationale noted earlier: namely, the ground forces' share decreases from 23 percent in 1987 to 20 percent in the 1990s; the air forces' share remains at 22 percent; the naval forces' share decreases from 18 percent in 1987 to 17 percent; POV's rises from 11 percent in 1987 to 12 percent in the 1990s; the SRF's share decreases from 6 percent in 1987 to 5 percent in the 1990s; and the RDT&E share rises from 20 percent in 1987 to 24 percent throughout the 1990s.

¹²See Charles Wolf, Jr., et al., *Long-Term Economic and Military Trends, 1950-2010*, The RAND Corporation, N-2757-USDP, April 1989; and *The Future Security Environment*, Report of the Future Security Environment Working Group to the Commission on Integrated Long Term Strategy, Department of Defense and National Security Council, Washington, D.C., 1988.

¹³Alexei Arbatov in a discussion at The RAND Corporation, July 3, 1990.

Finally, the low spending estimates shown in Table 2 assume that military spending in 1995 declines by 25 percent from the higher ruble and dollar levels (141 billion rubles and 271 billion dollars) assumed in the alternative estimates for 1987 shown in Table 1, thereafter growing by 2.5 percent per year from 1995 through 2000.¹⁴ (Substantially deeper cuts, as deep as 80 percent below the 1987 estimates, are considered in several other options developed later in this report.) Again, in accord with the strategic rationale noted earlier of a Soviet shift toward smaller, defensive forces, the shares allocated to the Soviet services are assumed in the low spending estimates to change as follows: The ground forces' share falls from 23 percent in 1987 to 18 percent during the 1990s; the air forces' share remains constant at the 22 percent level of 1987; the naval forces' share decreases to 16 percent in the 1990s from 18 percent in 1987; POV's share rises from 11 percent in 1987 to 13 percent; the SRF's share falls from 6 to 5 percent; and the RDT&E share increases to 26 percent in the 1990s from 20 percent in 1987.¹⁵

These translations of changes in Soviet declaratory policy and doctrine into changes in budget shares for the services and for RDT&E are somewhat arbitrary as well as arguable. They seem, however, to be generally consistent with the discussions and descriptions of the policy and doctrinal changes announced by the Soviet leadership.

¹⁴The 25 percent reduction assumed in this estimate exceeds the military spending reduction (i.e., 14 percent) proposed by Gorbachev and Ryzhkov in the June 1989 Congress of People's Deputies (*The New York Times*, June 8, 1989, p. 1). Moreover, the reduction proposed by Gorbachev and Ryzhkov referred to a total military spending level (77 billion current rubles) that is more than 35 percent below the 119 billion (in 1982 rubles) used in our estimates.

¹⁵Compare Rose E. Gottemoeller, *Conflict and Consensus in the Soviet Armed Forces*, The RAND Corporation, R-3759-AF, October 1989.

IV. FINAL RESOURCE USE FOR NONMILITARY SECTORS

ESTIMATION PROCESS

As noted earlier, the nonmilitary components of final resource use are personal consumption, collective consumption, investment, and the current account balance. Thus,

$$\begin{aligned}\text{Final resource use} = & \text{ personal consumption} + \text{collective} \\ & \text{consumption (government)} + \text{investment} \\ & + \text{military spending} - \text{current account} \\ & \text{balance}\end{aligned}$$

In estimating final resource uses for these nonmilitary components, we have used adjusted sector-of-origin data as proxies for final demand according to the following procedure: (1) we use food and nonfood consumer-goods production to reflect final demand for personal consumption; (2) we use health, education, and housing output to make up final demand for collective consumption as well as for investment outlays in these sectors; (3) we represent the principal investment component of final demand with investment outlays for transportation, communication, environmental protection, and the energy sector, together with a residual category of "machinery, equipment, and construction" covering investment in the defense industry, the consumer-goods industry, and agriculture; (4) we use empire costs to represent incremental resources expended in Soviet external activities not elsewhere covered in Soviet national accounts.

In accord with this procedure, estimates of final resource use for 1987, 1995, and 2000 have been made for nine sectors besides the military: housing, health, education, food and food products, nonfood consumer goods and services, transportation and communication, energy, environmental protection, and empire costs. A tenth sectoral estimate is included for machinery, equipment, and construction, covering investment goods that are not included in those sectors. For example, the estimates of resource use in food and food products, and in nonfood consumer goods, exclude investment outlays for expanding plant and equipment in these sectors. Allowance for this resource use is covered by the separate sectoral estimate for investment goods (machinery, equipment, construction).

The estimate for the 11 sectors—military spending; the nine nonmilitary sectors; and residual machinery, equipment, and construction—represents a combination of final output (“sector-of-origin”) data and final demand data. This crosswalk between sectoral and final demand accounts is intended to highlight, at an aggregate level, the principal competing resource claims and allocative choices facing the Soviet leadership. Toward this end, the alternatives are designated in terms more directly related to potential policy decisions than are the separate final-demand accounting categories standing alone. For example, the choice between, say, housing and energy investments or between non-food consumer goods and empire costs focuses more sharply on alternative policy options than would a choice between aggregate consumption and investment—the latter representing the standard final-demand classification.¹

The second column of Table 3 shows benchmark estimates for 1987 (in 1982 rubles) for the ten nonmilitary sectors.²

¹In other words, the aim is not merely to present allocative choices in terms of investment versus consumption (as would the standard final-demand categories) but to focus instead on *kinds* of consumption (e.g., collective or personal) and *kinds* of investment (e.g., transportation, energy, other machinery, equipment, and construction). By the same token, use of only the standard sector-of-origin classification would overlook allocative choices relating to military policy and foreign policy (empire costs)—categories that are excluded from the sector-of-origin categories. Combining sector-of-origin and final demand categories, as we have done in the sectoral estimates, entails some risk of double counting due to intermediate output by some sectors (e.g., energy) for use by other sectors (e.g., consumer-goods production). However, the extent of this potential error is small because the energy sector's estimate in Table 3 represents only that sector's investment outlays, whereas the estimate for the other principal sector producing intermediate outputs—transportation (which includes both its investment and operating outlays)—is only a minor component of the outputs of the other sectors as they are estimated in Table 3.

²It was originally intended that dollar as well as ruble estimates for the sectors be included, as is done for the military services and GNP estimates shown in Tables 1 and 2. This intention was shelved because the ruble/dollar conversion ratios, developed to make the dollar estimates, span an enormous range—varying by a factor of seven—with at best limited economic meaning attached to them. As Birman has cogently observed: “The price structure of the Soviet economy is so unique that it simply must not [cannot?] be measured in foreign currencies” (Birman, “The Soviet Economy,” cited by John Howard Wilhelm, “Crisis and Collapse: What Are the Issues,” *Soviet Studies*, April 1990, Vol. 42, No. 2, pp. 324 ff.). The ruble estimates suffice for addressing the central issue of this study: namely, the competing claims among sectoral end uses of Soviet national product. The dollar estimates for the military services presented in Tables 1 and 2 are of interest in their own right, apart from dollar comparisons with other sectors.

Table 3
FINAL SOVIET-RESOURCE ESTIMATES: 1987, 1995, 2000
(In billions of 1982 rubles)^a

Sector	Benchmark Estimate	1987			1995			2000		
		High	Medium	Low	High	Medium	Low	High	Medium	Low
Military expenditures ^b	119	129	119	98	139	131	110			
Housing ^c	39	71	64	53	83	75	62			
Health ^c	19	35	29	25	47	35	28			
Education ^c	30	68	56	46	87	65	49			
Consumer goods										
Food	170	265	236	220	308	264	239			
Nonfood ^c	190	375	303	244	503	366	265			
Energy ^d	24	60	38	28	98	49	31			
Transportation and communications ^d	38	36	34	32	36	34	32			
Environmental protection ^d	8	9	8	7	9	8	7			
Machinery, equipment, construction (NEI)	70	92	84	79	117	97	88			
Empire costs ^e	14	24	16	8	27	18	9			
Total	721	1164	987	840	1454	1142	920			

NOTE: NEI means not elsewhere included.

^aEstimates are based on the following GNPs in 1982 rubles and dollars: for 1987, 721 billion R and \$1731 billion; for 1995 base cases, 818 billion R and \$1965 billion; for 1995 alternatives, 818 billion R and \$1473 billion; for 2000 base cases, 900 billion R and \$2162 billion; and for 2000 alternatives, 900 billion R and \$1621 billion. See Table 1, footnotes b, c, and d. Ruble figures here and throughout the table were deflated to 1982 assuming an inflation rate of 5 percent per year.

^bSee Table 1, footnote e.

^cHeide Phillips Shockley, *Final Resource Use for Consumption in the Soviet Union through 2000*, The RAND Corporation, N-3162-USDP, forthcoming.

^dJeannette VanWinkle and Benjamin Zycher, *Future Soviet Investment in Transportation, Energy, and Environmental Protection*, The RAND Corporation, N-3173-USDP, forthcoming.

^e"Low," "medium," and "high" estimates are assumed to be 1 percent, 2 percent, and 3 percent, respectively, of Soviet GNP; compare Wolf et al., *The Costs and Benefits of the Soviet Empire*, pp. 14-18.

ESTIMATES FOR NONMILITARY SECTORS IN 1995 AND 2000

The remaining rows and columns of Table 3 present estimates of final demands for sectoral resource uses for 1995 and 2000 for the other nonmilitary sectors including the costs of empire.

In formulating high, medium, and low estimates of final demand for the nonmilitary sectors, an eclectic method has been used for all sectors, together with certain adjustments that were warranted by special data and other circumstances pertaining to the individual sectors. These adjustments are described and explained in the supporting studies of particular sectors that were made as part of the overall project.³

The draft of the 13th Soviet Five-Year Plan for 1990-1995 has provided a source of inputs for these estimates. However, its periodic and inconclusive revisions, variously emphasizing machine-building or alternatively consumer goods and conversion of defense industry, make the plan an unreliable basis for sectoral forecasts in the 1990s.

Our general method is to base the low estimate for the various sectors on recent trends in actual resources absorbed by these sectors, for the 1970-1984 or the 1980-1986 period as appropriate, and then to use these trends as a basis for extrapolation to the 1995 and 2000 time periods. For example, if a particular sector's final resource use grew by 1 percent or 2 percent in real terms during the reference period, this rate has been used to make the low estimate for that sector for 1995 and 2000.

By contrast, the high estimates shown in Table 3 are based on, or inferred from, several different sources: statements of intentions, goals, and demands by the Soviet leadership—Gorbachev, Ligachev, Shevardnadze, Ryzhkov, and others—as expressed in Party Plenums of 1986, 1987, and 1988; preparatory documents for the 13th five-year plan; the record of debates in the 1989 Congress of People's deputies; and other sources identified in the supporting sectoral studies for this project.⁴

For example, Ligachev has called for doubling investments in the education sector between 1990 and 2000, Health Minister Chazov has repeatedly pledged a tripling of the health budget by 2000, etc. Estimates for housing are based on goals envisaged by the Party Plenums (e.g., "a separate apartment or flat for every family by 2000," or "a

³See Heide Phillips Shockley, *Final Resource Use for Consumption in the Soviet Union through 2000*, The RAND Corporation, N-3162-USDP, forthcoming; and Jeannette VanWinkle and Benjamin Zycher, *Future Soviet Investment in Transportation, Energy, and Environmental Protection*, The RAND Corporation, N-3173-USDP, forthcoming.

⁴See Shockley, *Final Resource Use*, and VanWinkle and Zycher, *Future Soviet Investment*.

separate room for every person"), translated into square meters and costed.⁵

Estimates for the transportation and communication sectors rely principally on prior work by Holland Hunter and Vladimir Kontorovich. Estimates for environmental protection draw on prior work by Tikhonov and Zumbrunnen. Estimates of future energy investment, including investment required for nuclear-safety retrofits for graphite reactors, are based on a combination of Soviet reports and comparable U.S. experience.⁶

Finally, the medium estimates are judgmentally based between high and low, although not necessarily representing the mean.

Thus, the separate sectoral estimates highlight plans, goals, and prospects that can be derived or inferred by the various means described above. The GNP estimates for 1995 and 2000 (Table 3, footnote a), estimated independently of the sectoral figures, make up what can be viewed as a "budget line" or envelope constraining sectoral final demand. Because the actual totals of sectoral resource uses for 1995 and 2000 must ultimately fit within the GNP level of resource availabilities, gaps between the sectoral and GNP estimates indicate the severity of the resource bind confronted by the Soviet leaders and the difficult allocative choices they face.

Collective Consumption: Housing, Health, Education

As Table 3 indicates, the high estimates for aggregate collective or quasi-collective consumption in housing, health, and education in 1995, expressed in 1982 rubles, are approximately 98 percent above the benchmark estimates of 1987. This goal seems unlikely to be reached in light of the deprivation of these sectors, which continued through the 1980s.

The low estimates in Table 3 for these consumption sectors would be 41 percent above the 1987 figures, reflecting an annual compound growth rate in these sectors over 4 percent.

The estimates of final resource use for these sectors include capital formation and construction costs, as well as operating costs.

Table figures for the housing sector are derived from published estimates of construction costs per square meter, deflated at 5 percent per year, and from published estimates of housing construction in 1986-1987. Resource use in the health sector in 1987 is derived from state and nonstate 1985 spending, with a 1970-1985 historical growth

⁵See Shockley, *Final Resource Use*.

⁶See VanWinkle and Zycher, *Future Soviet Investment*.

annually of 4.4 percent added. The figures were deflated to 1982 rubles with an assumed annual inflation rate of 5 percent. Education spending in 1985 was 36.0 billion rubles, with growth rates during 1981-1985 of 3.7 percent annually. This yields 38.7 billion rubles for 1987; the assumed inflation rate of 5 percent results in 30 billion 1982 rubles for 1987.

Private Consumption: Food and Nonfood Consumer Goods

As Table 3 indicates, the high ruble estimates for 1995 (640 billion) for private consumption of food and nonfood consumer goods would represent a 78 percent increase over the 1987 benchmark figures for these final demand sectors, again reflecting unrealistically ambitious and optimistic statements of targets and goals by the leadership; the low 1995 estimates (464 billion rubles) still represent a 29 percent increase over the 1987 corresponding figures, a 3 percent annual compound rate of growth in private consumption (and perhaps 2 percent in per capita consumption). For 2000, the high estimates in Table 3 for private consumption imply a further increase of 27 percent over the 1995 estimates, while the low estimates represent an 8.6 percent increase over the corresponding figure in 1995.⁷

The estimates for these sectors are confined to final consumption demand and do not include their investment and construction outlays, which are instead allowed for in the machinery, equipment, and construction sector referred to below.

Food figures are from the CIA table "Soviet GNP by End Use" (at factor cost), provided to RAND, March 2, 1989. Input/output tables of nonfood figures for 1977 provided estimates for that year, which then were adjusted to 1982 rubles. An estimated growth rate of 4.2 percent for 1981-1985 was used to derive an estimate for 1987.

Energy, Transportation and Communication, and Environmental Protection

These principal infrastructure sectors are also important claimants on resource use for investment in the Soviet Union, if less obvious ones than the consumption sectors.⁸ The estimates for the infrastructure sectors include investment and construction costs as well as their maintenance costs. The energy sector's special importance also reflects its vital export role as the main source of hard-currency foreign

⁷See Shockley, *Final Resource Use*.

⁸Inclusion of energy as an "infrastructure" sector is based on its role as an input to other final-demand sectors.

exchange in the Soviet Union. In addition, the sector's growth reflects the rising costs of extraction, which the Soviets are encountering.

Transportation, communication, and environmental protection are also high-priority elements because they have experienced severe neglect and deterioration in the past two decades. Moreover, whether these sectors—perhaps especially the transportation and communication sector—are repaired and upgraded, or instead continue to be neglected, will have serious repercussions throughout the economy.

"High" estimates for these three infrastructure sectors shown in Table 3 total 105 billion rubles in 1995. This would represent an unrealistically large increase of 50 percent over the 1987 figure, whereas the low estimate for 1995 represents a 4 percent decrease below the 1987 figure. The corresponding high estimates for 2000 represent an additional 36 percent increase over the 1995 figure, while the low estimate shown in Table 3 would be a 4 percent increase above the corresponding 1995 figure.⁹

Regarding energy, official Soviet figures on capital investment in the electric power, coal, and crude oil and gas sectors for 1987 were deflated to 1982 rubles using an assumed annual inflation rate of 5 percent.

Regarding transportation and communication, official Soviet figures on capital investment, working capital, and capital repair for 1987 were deflated the same way. This results in the apparent anomaly that all of the estimates for 1995 are below the 38 billion ruble figure for 1987 and that the 2000 estimates (in 1982 rubles) are the same as the corresponding high, medium, and low figures for 1995. In effect, the estimated rate of growth in nominal ruble spending on transportation and communication between 1995 and 2000 is equal to the assumed rate of inflation.

Regarding environmental protection, deflation of official Soviet figures on capital investment and operations and maintenance for 1987 results in the apparent anomaly that the estimates of environmental spending are unchanged between 1995 and 2000 because the rate of growth in nominal ruble spending is equal to the assumed rate of inflation.

Machinery, Equipment, and Construction Not Elsewhere Included

The investment components of final resource use in the three infrastructure sectors and the three collective consumption sectors (health, housing, and education) are already included in the final resource-use estimates for those sectors. Consequently, the estimates in Table 3 for

⁹See VanWinkle and Zycher, *Future Soviet Investment*.

the sector denoted as "machinery, equipment, and construction (NEI)" cover only the investment component of the other four sectors: namely, defense industry, food and food products (including agriculture), non-food consumer-goods production, and the external empire. This estimate also includes investment goods for the "machinery, equipment, and construction" residual sector itself: that is, producers' durable goods added to the stock of capital for production in this sector.

Estimates are based on the following assumptions: (1) output of machine-building, metal-working (MBMW), and construction is divided equally between the included and excluded sectors; (2) in 1987, the total output of MBMW and construction was 139 billion 1982 rubles (see CIA, "GNP by Sector of Origin" [at factor cost], Table 11) or 250 billion 1982 dollars (see Table 1 for implicit ruble/dollar ratio of 0.555 in alternative GNP estimate); (3) between 1987 and 1990, MBMW and construction are assumed to grow in real terms by 1 percent per year to 144 billion rubles (258 billion 1982 dollars), divided as indicated in assumption 1 above; (4) for the period from 1990 through 2000, the high estimate assumes a growth rate of MBMW of 5 percent per year, while the low estimate assumes a growth of 2 percent, and the medium estimate a growth of 3 percent per year from the 1990 figure of 144 billion rubles in 1982 prices.

Assumption 1—that the residual estimate of final demand for machinery, equipment, and construction assumes that the output of the machine-building, metal-working, and construction industries is divided equally between the included and excluded sectors—seems reasonable in light of the actual resource use data for 1987.¹⁰ Indeed, this assumption is more likely to err on the side of underestimating the share of total investment demand in these sectors and overestimating that for the infrastructure and collective consumption sectors than it is to err in the reverse direction. Total MBMW and construction output is assumed to grow between 1987 and 1990 by 1 percent per year in real terms, divided equally between the included and excluded sectors.

Costs of Empire

Through the earlier years of the 1980 decade, the costs of the Soviet empire—reflecting resource use for the Soviet Union's extended international activities that is not otherwise covered by our estimates of the other sectors' final demands—were estimated at approximately 3 to 4

¹⁰See CIA/DIA, "The Soviet Economy in 1988," appendix.

percent of Soviet GNP.¹¹ The benchmark figure shown in Table 3 assumes that, by 1987, empire costs had decreased to 2 percent of the Soviet GNP. Thereafter, the low, medium, and high estimates shown in Table 3 for 1995 and 2000 assume empire costs of 1, 2, and 3 percent, respectively, of GNP. This results in a further decline in the empire's cost share of Soviet GNP in the low case because Soviet GNP is assumed to grow at more rapid rates.¹²

These costs include Soviet foreign economic aid; unrequited exports to Eastern Europe (if any remain after 1990), Cuba, Vietnam, Nicaragua, North Korea, Afghanistan, and other parts of the extended if diminishing Soviet empire—whether these unrequited exports are financed by grants, subsidized loans, underpricing of Soviet exports, or overpricing of imports;¹³ net military foreign aid; and the costs of Soviet foreign bases and covert operations.¹⁴ Net exports from the other ten sectors are implicitly assumed to be included in the estimates of empire costs.

As was the case with the military spending estimates referred to earlier, these empire cost estimates seem higher and less probable in 1990 than when they were originally made in 1989. They are included here to provide a wide range for consideration. Substantially deeper cuts (from 50 percent to complete elimination) are considered in several other options developed later in this study.

¹¹See Wolf et al., *The Costs and Benefits of the Soviet Empire*, pp. 14-18.

¹²Ibid.

¹³Ibid. An example of export underpricing is oil shipments from the Soviet Union to Vietnam, representing an opportunity cost in terms of forgone Soviet national product. An example of import overpricing is the premium the Soviets pay for Cuban sugar imports, representing a further Cuban claim on Soviet oil or other resources.

¹⁴Ibid.

V. ALTERNATIVE POLICY CHOICES

PURPOSE AND CONTENT

Our principal purpose in formulating allocative options from the foregoing estimates is to illustrate and highlight the policy choices and conflicting claims facing the Soviet leadership, to suggest the constraints impinging on these choices, and to provide a basis for evaluating Soviet actions and policy statements in the coming years.

Usually policy choices are reflected both by actions—which may or may not be observable—and by declaratory statements describing those actions. Of course, declaratory statements may not be exactly congruent with actions for several possible reasons: first, statements may be anticipatory of actions yet to be taken (e.g., Soviet statements over the last few years concerning an intended expansion of the consumer-goods supply); second, the actions that correspond to declaratory statements may not be clearly or fully observable (e.g., reductions in Soviet offensive forces); or third, the statements may be deliberately intended to mislead (e.g., statements about the predominantly, if not exclusively, nonmilitary uses of Soviet space programs and the oft-repeated denial by the Soviets that the Krasnoyarsk radar violated the antiballistic missile treaty—a denial that was finally disavowed by Shevardnadze in 1989).

The major allocative choices confronting the Soviet leadership lie somewhere between a series of rocky shoals and other hard places. Because of the severity of the Soviet economic predicament,¹ decisions by the leadership to focus on particular sectors, or to emphasize particular allocative directions, entail high opportunity costs in terms of neglect or deferment of some sectors. For example, emphasis on expanding the consumer-goods supply would restrict resources available for expanding collective consumption services, such as housing and health, as well as imply continued neglect and deterioration of the transportation and distribution infrastructure in the Soviet economy. Reductions in military spending would degrade readiness, deplete force structure, and defer or prolong force modernization. Yet, as discussed below, such reductions would not provide sufficient resource savings to meet the high consumption goals, although they would allow for a limited move in that direction.

¹For extended discussions of the near-crisis condition of the Soviet economy, see Aganbegyan, *Inside Perestroika*; Aslund, *Gorbachev's Struggle*; and Rowen and Wolf, *The Impoverished Superpower*.

FOUR ALLOCATIVE OPTIONS

The sectoral estimates described above and summarized in Tables 2 and 3 are used as building blocks to construct packages of alternative allocative directions and policy choices. These packages represent directions that the leadership, presumably in conjunction with the Supreme Soviet, might choose within the ultimate constraint imposed by the estimates previously made of Soviet GNP in 1995 and 2000. Table 4 summarizes four packages. The building blocks can be used to construct numerous others.

Table 4 shows two types of consumption policy that the leadership might select. Consumption Policy I emphasizes collective and quasi-collective consumption. It comprises the high final demands for housing, health, and education referred to in Table 3 and combines these with medium allocations for food and nonfood consumer goods and with low allocations for the military, the infrastructure sectors, machinery, equipment, and construction, and the Soviet empire. Policy I generates final demands of 965 billion rubles in 1995 and 1124 billion rubles in 2000, thereby exceeding estimated *available* resources (GNP) in those years by 18 and 25 percent, respectively.

Consumption Policy II reverses the consumption emphasis, opting instead for high allocations for the food and nonfood consumption sectors, medium allocations for housing, health, and education, and maintaining the low estimates of final demand for other sectors. Policy II generates final demands of 1041 billion rubles in 1995 and 1263 billion rubles in 2000, exceeding the GNP "budget line" in those years by 27 and 40 percent, respectively.

Policies I and II are shown in Fig. 1, based on consolidation of the 11 sectors of Table 3 into four functional categories: collective consumption (housing, health, and education); personal consumption (food and nonfood consumer goods); infrastructure (energy, transportation and communication, and environmental protection) and other capital investment (machinery, equipment, and construction); and the military and empire.

The third policy summarized in Table 4, "Investment and Infrastructure," emphasizes (1) capital investment and (2) repair and rebuilding of the Soviet infrastructure. As a reflection of this stance, Policy III consists of high sectoral allocations for machinery, equipment, and construction; medium final demand for energy, transportation and communication, and environmental protection; and low allocations for final resource use by all other sectors. Policy III generates final resource demands of 866 and 970 billion rubles in 1995 and 2000, respectively—thereby exceeding resource availabilities in those years by 6 and 8 percent, respectively.

Table 4
FOUR SOVIET ALLOCATIVE OPTIONS: 1985, 2000
(In billions of 1982 rubles)^a

Sector	Consumption Policy I (Collective consumption)				Consumption Policy II (Personal consumption)				Investment and Infra-structure Policy III				Military Moderniza-tion Policy IV			
	Allocation Level	1985	2000	Allocation Level	1985	2000	Allocation Level	1985	2000	Allocation Level	1985	2000	Allocation Level	1985	2000	
Military expenditures	Low	98	110	Low	98	110	Low	98	110	Med	119	131				
Housing	High	71	83	Med	64	75	Low	53	62	Low	53	62				
Health	High	35	47	Med	29	35	Low	25	28	Low	25	28				
Education	High	68	87	Med	56	65	Low	46	49	Low	46	49				
Consumer goods																
Food	Med	236	284	High	265	308	Low	220	239	Low	220	239				
Nonfood	Med	303	366	High	375	503	Low	244	265	Low	244	265				
Energy	Low	28	31	Low	28	31	Med	38	49	Low	28	31				
Transportation and communication	Low	32	32	Low	32	32	Med	34	34	Low	32	32				
Environmental protection	Low	7	7	Low	7	7	Med	8	8	Low	7	7				
Machinery, equipment, construction (NEI)	Low	79	88	Low	79	88	High	92	117	Med	84	97				
Empire costs	Low	8	9	Low	8	9	Low	8	9	Low	8	9				
Total	NA	965	1124	NA	1041	1283	NA	866	970	NA	866	950				

NOTE: NEI means not elsewhere included; NA means not applicable.

^aSee Table 3 for ruble estimates corresponding to high, medium, and low designators. Also see Table 3 for ruble and dollar GNP estimates.

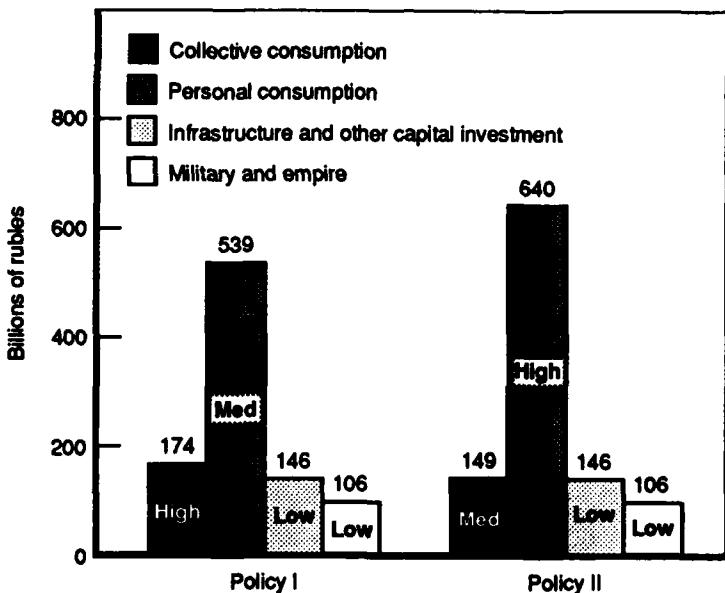


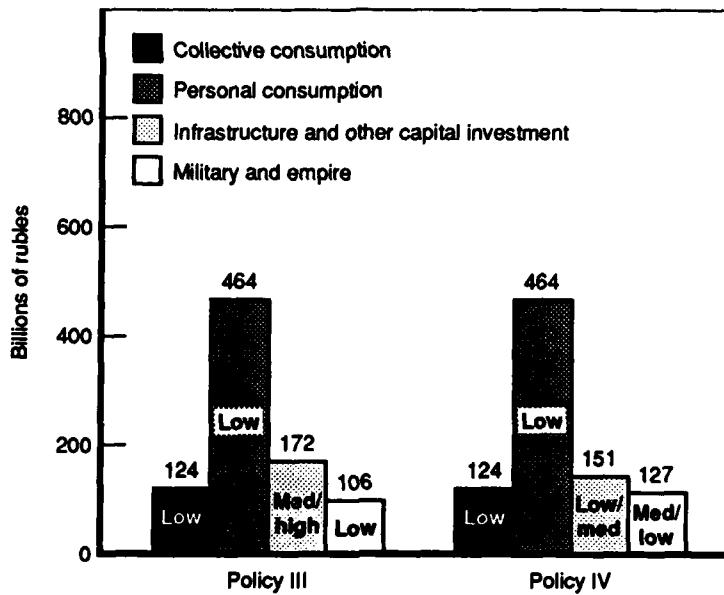
Fig. 1—Policies I and II, respectively emphasizing collective consumption and personal consumption: 1995
(in billions of 1982 rubles)

Policy IV in Table 4, "Military Modernization," opts for medium resource allocations to the military as well as to the machinery, equipment, and construction sector while confining all other sectors to the low estimates shown in Tables 2 and 3. This policy would generate final demands in 1995 and 2000 that would exceed the corresponding GNPs by about 6 percent in both years.

Figure 2 reproduces Policies III and IV, again consolidating the 11 sectors of Table 3 into four functional categories represented by the corresponding bars.

Several additional allocation policies, calling for deeper cuts in military and empire spending, are considered later in the study.

The method used to construct our policy alternatives probably involves some underestimation of the actual resource costs associated with each of them because, as specified in a particular option, the interindustry demands created by a high allocation to one sector might thereby boost demands in another sector above the low allocation. For example, the collective and personal consumption policies would probably boost demands for the machinery, equipment, and construction sector somewhat above the low level assigned to that sector in these options. However, any underestimation is likely to be relatively small



NOTE: In Policy III, capital investment is "high" and infrastructure is "medium." In Policy IV, infrastructure is "low" and other capital investment is "medium."

Fig. 2—Policies III and IV, respectively emphasizing investment and infrastructure, and military modernization: 1995
(in billions of 1982 rubles)

and probably concentrated in the two consumption options. Moreover, biasing the estimates downward represents an *a fortiori* procedure in view of the study's aim: namely, to evaluate the consistency between the separate policy alternatives and the Soviet economy's aggregate size and growth prospects.

Recalling our earlier comments about the relation between declaratory statements and actions, we note that each of the four illustrative packages reflects, and is consistent with, various and sometimes conflicting policy statements by the leadership. Even the military modernization option, while at variance with some recent Soviet policy statements, recalls the admonitions and advocacy of Marshall Ogarkov in the early 1980s. Moreover, the types of force modernization that this option would allow could quite conceivably be reconciled with the

recent policy statements by Gorbachev, Ryzhkov, and Shevardnadze calling for reductions in forces and total military spending.²

Evidence pertinent to each of the four options shown in Table 4 should, in principle, be observable in the coming years. Hence, tracking the investment and expenditure patterns corresponding to these options should lead to more informed judgments by the United States about which directions, or which combinations and compromises, are actually being chosen or made by Soviet decisionmakers during the next several years.

OPTIONS WITH DEEPER MILITARY CUTS

As noted earlier, the sectoral building blocks of Tables 2 and 3 can be used to construct additional possibilities that may be considered by the leadership and other participants in Soviet decisionmaking, or those possibilities may ensue by force majeure: that is, by the severity of resource constraints that largely determine the outcome by sharply delimiting choice.

As an indication of the severity of the Soviets' aggregate resource constraints, consider the scope that would be provided for sectoral reallocations if maximum cuts were made in Soviet military and empire spending.

Table 5 illustrates two such cases. In Policy V, "Deep Military Cuts, Medium Sectoral Reallocations," military spending in 1995 has been reduced by 80 percent from the 1987 figure (82 percent from the higher-alternative level of 131 billion rubles shown in Table 1), and all empire costs have been eliminated. Nevertheless, the GNP "savings" (14 percent of the 1987 level) are insufficient to allow reallocation to the medium estimates for the collective consumption, personal consumption, infrastructure, and other investment sectors.

The total resource demands (876 billion rubles) for this hypothetical reallocation in 1995 exceed the estimated GNP (818 billion rubles) by 7 percent.

Table 5 also illustrates another option, Policy VI, in which deep military cuts (62 percent below 1987 levels) and elimination of empire burdens are linked with reallocations to all other sectors at their corresponding low targets for 1995. The reductions called for in Policy VI would enable the low targets for the consumption, infrastructure, and capital investment sectors to be realized. Total final demands (779

²See the extensive discussion by Jeremy Azrael of the conflict between the Soviet civilian leadership and the military high command, especially the recent episodes in that story (Azrael, *The Soviet Civilian Leadership*, esp. pp. 47-59).

Table 5

SECTORAL REALLOCATIONS WITH DEEP MILITARY
AND EMPIRE REDUCTIONS: 1987, 1995
(In billions of 1982 rubles)^a

Sector	1987 Level of Spending	1995	
		Policy V: Deep Military Cuts, Medium Sectoral Reallocation	Policy VI: Deep Military Cuts, Low Sectoral Reallocation
Collective consumption	88	149	124
Personal consumption	360	539	484
Infrastructure and other capital investment	140	164	146
Military	119 (131) ^b	24	45
Empire	14	—	—
Total	721	876	779

SOURCES: Tables 1 through 4.

^aFigures are based on a 1987 GNP of 721 billion 1982 rubles and a 1995 GNP of 818 billion 1982 rubles.

^bThe alternative military-spending estimate of 131 billion 1982 rubles is from Table 1.

billion rubles) would be within the GNP "budget line" (818 billion rubles) in 1995.

AUSTERITY, REALLOCATION, AND REFORM

None of the previous options has envisaged the release of substantial resources for allocation by free-market forces. However, a genuine reform effort along this line could be pursued by selecting only one or two of the collective or public-goods sectors for emphasis, enforcing rigorous austerity for the remainder, imposing sharp reductions on military and empire spending, and releasing the remaining resources for allocation by the market.

Table 6 illustrates this option. Policy VII consists of rolling back most of the sectoral allocations to their 1987 levels ("austerity") but according preferential treatment to two sectors ("reallocation"). One of the sectors falls under collective consumption (e.g., housing, selected because of the severe deprivation of housing facilities in the past) and one under infrastructure (e.g., transportation and communication, selected because of this sector's especially critical, accumulated shortfalls in rolling stock and maintenance). This cuts military and empire costs by 50 percent below 1987 levels and releases for market reallocation a volume of resources ("reform") of about 473 billion rubles—approximately the level of the low targets for food and consumer goods in 1995. Thus, in Policy VII, the resources released for market

Table 6
AUSTERITY, REALLOCATION, AND REFORM: POLICY VII
(In billions of 1982 rubles)

Category	1987	1995
GNP	721	818
Housing	39	71 (High)
Health	19	19
Education ^a	30	30
Food	170	
Nonfood consumer goods	190	473 ^b
Energy	24	24
Transportation and communication	38	56 ^c
Environmental protection	8	8
Machinery, equipment, construction ^d	70	70
Military	119	60
Empire	14	7
Sectoral Totals	721	818

^aHousing, health, and education subtotal for 1995 is 120.

^bResources released for market allocation for both food and nonfood consumer goods.

^cThis hypothetical reallocation exceeds the nominal high estimate for this sector by 20 billion rubles on the premise that increased investment on this scale would be warranted to compensate for the pervasive deterioration of the rolling stock and the economy's entire distribution system.

^dInfrastructure subtotal for 1995 is 158.

reallocation are simply the residual after allowing for rollbacks and reallocations among the other sectors. The scale of the released resources—58 percent of the GNP—would be sufficiently large to generate the market-based signals (namely, factor prices and product prices) necessary to move the Soviet system toward economically “rational” resource uses.

Hence, as Table 6 indicates, Policy VII, like Policy VI, is “feasible” in the sense that sectoral resource demands equal GNP.

A PLAUSIBLE PESSIMISTIC SCENARIO

The preceding policies adopt the macroeconomic scenario summarized in Table 2: namely, GNP estimates that assume 1.6 percent growth through 1995 and 2 percent from 1996 to 2000. These assumptions are perhaps unrealistic in light of the Soviet economy's evident decline in recent years. Another scenario, that is probably both more realistic and more pessimistic, can be developed by varying these assumptions along the following lines:

1. Between 1987 and 1991, Soviet GNP may have declined by as much as 25 percent—for example, decreasing by 5 percent between 1987 and 1989, 10 percent in 1990, and another 10 percent in 1991—as a result of both internal political disarray and inadequacy of attempted economic reform.
2. From 1992 to 1997, GNP may stabilize and then resume a growth of, say, 2 percent annually as a result of more settled political conditions—and some progress with economic reform measures.

Associated with this macroeconomic scenario, an illustrative policy for the various sectors can be composed of the following further assumptions:

1. Reducing the military sector in 1995 to 50 percent below the 1987 level,
2. Reducing empire outlays to about 70 percent below the 1987 level,
3. Setting the other nine sectors at the low sectoral estimates shown in Table 3 or, alternatively, rolling them back to their corresponding 1987 levels.

The point of this exercise is to examine how acute the situation would become, and how severe Gorbachev's constraints would be, if the

economy's performance were as poor as this scenario assumes. The results of these calculations are summarized in Table 7.

If a scenario as adverse as that envisaged in Table 7 were to occur, the predicament of Gorbachev or his successors would indeed be dire. The sectoral investment and consumption levels of 1987 would exceed the estimated 1995 GNP by nearly 19 percent (658 versus 555 billion 1982 rubles), requiring even deeper cuts in sectoral and military resource allocations. By 2000, after modest GNP growth had resumed, the 1987 level of sectoral resource claims would still exceed GNP by nearly 12 percent (658 versus 589 billion 1982 rubles).

Assuming a continued GNP growth of 2 percent annually, the 1987 levels of total sectoral resource use would be reached in 2005.

Table 7

A PLAUSIBLE PESSIMISTIC SCENARIO: 1987, 1995, 2000
(In billions of 1982 rubles)

Category	1987	1995		2000	
GNP	727		555		589
Military	119 (131) ^a		66		66
Empire	14		4		4
		1995		2000	
Sector	1987	Option A	Option B	Option A	Option B
Collective consumption	88	124	88	139	88
Personal consumption	360	464	360	504	360
Infrastructure and other capital investment	140	146	140	158	140
Total (including military and empire costs)	—	804	658	871	658

NOTE: Option A assumes that sectoral allocations are set at the low levels shown in Table 3, whereas Option B assumes that sectoral allocations are rolled back to their 1987 levels.

^aThe alternative military-spending estimate of 131 billion 1982 rubles is from Table 1.

VI. IMPLICATIONS OF THE ALLOCATIVE ALTERNATIVES

We drew several significant inferences from the options described in Tables 4 through 7 and the accompanying figures.

1. The initial four allocative policies summarized in Table 4 exceed the prior ruble estimates of Soviet GNP by amounts that vary from 6 to 40 percent: Consumption Policy I exceeds the ruble GNP estimates by 147 billion rubles (18 percent of GNP) in 1995 and 224 billion rubles (25 percent) in 2000; Consumption Policy II exceeds ruble GNP by 223 billion rubles (27 percent of GNP) in 1995 and 363 billion rubles (40 percent) in 2000; Investment and Infrastructure Policy III exceeds the GNP by 48 billion rubles (6 percent) in 1995 and 70 billion rubles (8 percent) in 2000; and Military Modernization Policy IV exceeds available GNP resources by 48 billion rubles (6 percent) in 1995 and 50 billion rubles (6 percent) in 2000.

Three possible explanations or implications, or some combination of them, would account for the disparity: Soviet imports and loans may bridge some of the gap; our GNP estimates may be too low; or—most likely—the sectoral estimates, even for the low targets, may be unattainable.

2. Moreover, if military spending were cut more deeply—by nearly two-thirds in Policy V and by one-half in Policy VI—and empire costs were also severely reduced, only modest goals for the nonmilitary sectors could be realized.
3. Thus, pressures to reduce military spending are and will be intense, although the resource savings derived from this source will still not be sufficient to meet the high sectoral demands associated with other policy objectives. For example, the 25 percent cut in 1987 military spending shown in Tables 2 and 4 would still leave Policy I "short" by 185 billion rubles (23 percent of Soviet GNP). Were 1987 military spending to be cut even further—say, by 50 percent by 1995—Policy I would still be short by 152 billion rubles or 19 percent of GNP. However, cuts of this magnitude—coupled with elimination of empire costs, as in Policy VI—would allow the low targets of the other sectors to be reached by 1995.

4. A corollary of the preceding points is that Soviet motivation for arms-control measures that involve genuine force reductions and real resource savings in operating and investment costs is and will be powerful. A second corollary is that the Soviets are likely to increase emphasis in the next few years on the (1) production of consumer goods by the defense industry and (2) large-scale conversion of the defense industry for civil production.¹
5. A substantial disparity remains between the resource requirements associated with most of the alternative policies and the resource availability needed to effect these policies. Under most of the policies, reallocations among sectors could contribute more resources but would not resolve the resource-availability problem.
A corollary of this point is that Soviet interest in substantial external financing to fund commodity imports may be very high—in the neighborhood of several hundred billion dollars—in the next decade. For example, even with the 25 percent cut in military spending reflected in the low military option, the 185 billion ruble excess of final resource use represented by Policy I, and the 249 billion ruble excess represented by Policy II, would require foreign financing and an annual import surplus of over 100 billion dollars in 1995 to bridge the implied resource gap.
6. Pressure will continue and intensify to reduce subventions to members and associates of the extended Soviet empire. From the low estimates of empire costs, embodied in four of the policy packages, we infer substantial reductions (about 40 percent) from the 1987 levels expended for Cuba, Vietnam, Afghanistan, Nicaragua, North Korea, and in Soviet activities elsewhere in the Third World.² Still deeper cuts are reflected in Policies V through VII; in two of them (Policies V and VI), empire costs are eliminated.
7. All of the previous estimates proceed from the premise that the Soviet economy will experience slow but sustained GNP growth (between 1.6 and 2 percent) between 1987 and 2000.

¹See Arthur J. Alexander, *Perestroika and Change in Soviet Weapons Acquisition*, The RAND Corporation, R-3821-USDP, June 1990.

²Soviet empire costs in 1983 were estimated at about \$29 billion and about 28 billion rubles (see Wolf et al., *The Costs and Benefits of the Soviet Empire*). By 1987, we assume that empire costs had already declined to about 2 percent of Soviet ruble GNP or 14 billion rubles. The low empire cost estimate embodied in Policies I through IV assumes that this figure is reduced by 40 percent.

If, instead, substantially negative growth ensues, as shown in Table 7, sectoral resource availabilities would decline well below their 1987 levels, notwithstanding deep cuts in military and empire spending.

8. If and as it becomes unambiguously clear to Soviet leaders that their declared objectives cannot be realized by centrally determined resource shifts and reallocations, the dilemma posed at the outset—pressure for centralized allocative decisionmaking versus pressure for decentralization and fundamental systemic reform—will intensify.³ Ultimately, easing of the aggregate resource constraints depends on a more decentralized, genuinely market-oriented reform. One might surmise, from this line of reasoning, that the argument for and advocacy of a radical reinterpretation of *perestroika* will grow because it offers the way of eventually resolving the dilemma.

Policy VII represents a move in this direction by combining several ingredients: "austerity," in rolling back most of the investment and consumption sectors to 1987 levels; "reallocation," in according preferential treatment to the housing and transportation/communication sectors; and "reform," in releasing the remaining resources for market-based uses in producing food and nonfood consumer goods.

³The severity as well as subtlety of the dilemma are suggested by Deputy Prime Minister Abalkin's remarks at a high-level economic conference in Moscow on November 13, 1989: "We are in risk of a creeping return, an unseen return . . . to the old system. . . . You won't find anyone who advocates a return . . . , but inch by inch, an 'instruction' here and an 'order' there, a real return develops." *Los Angeles Times*, October 14, 1989.